

REMARKS

Claims 1 through 10, 12, 13 and new Claim 14 are pending in the application.

Claim 1 has further been amended to reflect advantageous embodiments in which the casing or the polyamide inner layer of the casing has a swelling value of at least 5%, and the food casing is either single-layered and the thickness of the single-layered casing is 20 to 130 μm or the food casing is multilayered and the thickness of the polyamide inner layer of the multilayered casing is 15 to 70 μm . Support for this amendment can be found in the Application-as-filed, for example in on Page 4, lines 5 through 7 and lines 21 through 27.

Claim 3 has been amended to reflect advantageous embodiments in which the inventive casings include a polyamide inner layer of the casing having a swelling value of 8 to 100 % at 23 $^{\circ}\text{C}$. Support for this amendment can be found in the Application-as-filed, for example in on Page 4, lines 5 through 10.

Claims 9 and 10 have been canceled in conformance with Claim 1 as-amended.

Claim 13 has been amended to reflect advantageous liquid-smoke-impregnated food casings based on polyamide and/or copolyamide alone. Support for this amendment can be found in the Application-as-filed, for example in on Page 8, lines 6 through 35.

Claim 13 has also been amended to reflect advantageous embodiments in which the casing or the polyamide inner layer of the casing having a swelling value of 25 to 100 %. Support for this amendment can be found in the Application-as-filed, for example in on Page 4, lines 5 through 17.

Claim 13 has further been amended to reflect advantageous food casings in which the polyamide inner layer of the multilayered casing has a thickness of 15 to 27 μm . Support for this amendment can be found in the Application-as-filed, for example in on Page 8, lines 24 through 33.

Claim 14 has been added to complete the record for examination and highlight advantageous embodiments of the invention.

Claim 14 is directed to advantageous embodiments in which the polyamide and/or copolyamide alone is selected from nylon 6; nylon 6,6; nylon 6/6,6; nylon 4,6; nylon 6,10; nylon 6, 12 and mixtures thereof, optionally further comprising polyether amide; polyester amide; polyether ester amide; polyamide urethane or up to 30 % by weight of at least one partially aromatic (co)polyamide. Support for Claim 14 can be found in the Application-as-filed, for example in on Page 5, lines 3 through 25.

Applicants respectfully submit that this response does not raise new issues, but merely places the above-referenced application either in condition for allowance, or alternatively, in better form for appeal. Reexamination and reconsideration of this application, withdrawal of all rejections, and formal notification of the allowability of the pending claims are earnestly solicited in light of the remarks which follow.

Section 112 Rejection

Claims 1 through 12 remain rejected over the recitation "surface tension". Applicants respectfully submit that, in contrast to the urgings of the Office Action at Page 2, Ref. No. 3, surface tension is a surface energy. In that regard, the Examiner's attention is kindly directed to the cited reference Principles of Principles of Colloid and Surface Chemistry, which expressly describes surface tension as surface energy, particularly surface free energy. (Page 255, Section

6.3)¹. Hence one skilled in the art would consider the terms surface tension and surface energy to be interchangeable. Should the Examiner prefer, Applicants are prepared to amend the foregoing term to the more exact recitation “surface free energy.”

Applicants further take this opportunity to respectfully make of record that Applicants are entitled to be their own lexicographer. Any special meaning assigned to the term must only be sufficiently clear in the specification that any departure from common usage would be understood by one skilled in the art. *Multiform Desiccants Inc. v. Medzam Ltd.*, 133 F.3d. 1473, 1477 (Fed Cir 1998)(as cited in MPEP 2111.01) One skilled in the art would readily understand that the “surface tension” noted within the Application-as-filed on Page 3 for a polymer layer which was “very readily wettable” referred to the energy provided by that surface, and hence its surface energy.

Applicants additionally respectfully submit that the nylon and nylon 6,6 noted within the Application-as-filed on Page 5, lines 3 through 6 are known in the art to exhibit a surface energy that are greater than 28 dyn/cm. Hence Applicants were clearly in possession of the claimed invention at the time of filing, in contrast to the urgings of the Office Action on Page 3.

Regarding the units of surface tension, Applicants respectfully submit that the cited Principles of Colloid and Surface Chemistry defines surface tension as a force per unit length, such as dynes cm⁻¹. (Page 252, Section 6.2.a. Ref. No. 1). Hence Applicants respectfully submit that the surface tension values provided within the Application-as-filed were a typographical error.

Accordingly, Applicants respectfully request withdrawal of this rejection.

¹ Principles of Colloid and Surface Chemistry 3rd Edition, Hiemenz and Rajagopalan, Chapter 6, pages 251 - 255 (1997).

*The Claimed Invention is Patentable
in Light of the Art of Record*

Claims 1, 2, 4 through 10 and 12 stand rejected over United States Patent Application Publication No. 2003/0059502 to Krallman et al., which matured into United States Patent No. 7,022,357 (“US 357”), in light of United States Patent No. 5,399,427 to Stenger et al. (“US 427”) and further in view of United States Patent No. 6,221,410 to Ramesh et al. (“US 410”). Claims 3 and 13 stands rejected over US 357 in light of US 427 and US 410 and further in view of United States Patent No. 4,897,295 to Erk et al. (“US 295”).

It may be useful to briefly consider the invention before turning to the merits of the rejection.

Cheese and sausage products may be smoked by various methods to modify their flavor and color, as well as preserve them. Conventional liquid-smoke-impregnated food casings, such as those disclosed in US 357, typically require an absorption time of at least 5 days. Even with such lengthy dwell times, heretofore known casings absorb relatively little liquid smoke, and can transfer only a little smoke color to the food. Consequently, browning agents must be added to conventional casings to reinforce the color. In that regard, the Examiner’s attention is kindly directed to the Application-as-filed on Page 2, lines 3 through 17 (discussing DE 101 24 581 A1, whose US equivalent is US 357).

Altogether unexpectedly, Applicants have found that casing layers formed from wettable, at least moderately swellable polymers that are of sufficient thickness can absorb quite elevated amounts of liquid smoke. In that regard, Applicants respectfully submit that even within the same polymer family, such as the nylon family, properties such as surface energy and absorption can differ significantly. Nylon 11 is known to have a lower surface energy in comparison to nylon 6,6, for example. Nylons having more lengthy main chains, such as nylon 11 and nylon 12, are further known to absorb significantly less moisture than nylons with more closely spaced amide groups, such as nylon 6 and nylon 6,6.

Applicants have more particularly found that liquid-smoke-impregnated, tubular, single-layer or multilayered food casing comprising a single-layer which is based on polyamide and/or copolyamide alone, or comprising an inner layer based on polyamide and/or copolyamide alone, in which the inside of the casing has a surface energy of greater than 28 dyn/cm may readily be impregnated on the inside with liquid smoke, such that an additional browning agent is not required.

In advantageous embodiments, the casing or the polyamide inner layer of the casing has a swelling value of at least 5%; and the food casing is either single-layered and the thickness of the single-layered casing is 20 to 130 μm or the food casing is multilayered and the thickness of the polyamide inner layer of the multilayered casing is 15 to 70 μm , as recited in Claim 1 as-amended. Such embodiments, providing an at least moderately swellable polymer of sufficient thickness (i.e. adequate mass), are readily impregnated on the inside with an adequate amount of liquid smoke, such that an additional browning agent is no longer required.

In especially advantageous embodiments, the inventive food casings incorporate polyamide and/or copolyamide alone as a sole or inner layer having a surface energy of 35 to 45 dyn/cm and either a single-layered thickness of 50 to 130 μm or a polyamide inner layer thickness of 15 to 27 μm in which the casing or the polyamide inner layer of the casing has a swelling value of 25 to 100 wt % and the foregoing properties permit the impregnation of the casing with liquid smoke in the absence of an additional browning agent, as recited in Claim 13 as-amended.

Applicants respectfully reiterate that the claimed invention is patentable in light of the cited references, considered either alone or in combination.

US 357 is directed to processes of applying a mixture of liquid smoke, and browning agent to an at least three layered film and allowing the mixture to remain in contact with the film for at least 5 days. (Col. 1, lines 17 – 21 and Col. 2, lines 30 - 35). US 357 expressly notes the

incorporation of browning agent on numerous occasions. (Col. 1, lines 17 – 18; Col. 2, lines 52 – 57; Col. 3, lines 25 – 27; Col. 3, lines 35 – 38; Col. 3, lines 43 – 60). In fact, US 357 indicates a minimum of 20 % browning agent within its coating mixture. (Col. 3, lines 37 – 38). US discloses that its liquid smoke and browning agent mixture is allowed to “act on” the casing for at least 5 days. (Col. 3, lines 19 – 20). US 357 further notes that the application of its “particular mixture of liquid smoke and browning agent” results in an increased depth of smoke flavor penetration. (Col. 3, lines 25 – 29). US 357 indicates nylon 11 and nylon 12 as suitable polyamides. (Col. 4, lines 34 – 37). US 357 is silent as to the surface energy of its films. US 357 is further silent as to the thickness of its casings.

Applicants respectfully submit that US 357 does not teach or suggest the recited liquid-smoke-impregnated food casing in which the casing is impregnated with liquid smoke, but not with an additional browning agent. Applicants respectfully submit that US 357, considered as a whole, clearly requires a browning agent. The Office Action’s urging on Page 10 that “there is no reason to believe that liquid smoke alone would not accomplish increasing the depth of smoke flavor penetration” is altogether contrary to the express teachings of US 357. Applicants further respectfully note that Applicant has not asserted that the browning agent alone is responsible for the increased depth of penetration, as further urged within the Office Action. Rather, US 357 expressly teaches that “a particular mixture of liquid smoke and browning agent” results “in an increased depth of smoke flavor penetration in the meat contained therein.” Hence US 357 clearly teaches that the liquid smoke and browning agent work in combination. Furthermore, US 357 indicates that the mixture can contain greater amounts of browning agent than liquid smoke.

The Office Action on Page 10 goes on to state that omission of an element is obvious if the function of the element is not desired. As noted above, the function of the browning agent in US 357, as admitted by US 357, is an increased depth of smoke flavor penetration in combination with liquid smoke. Applicants respectfully submit that an increased depth of smoke flavor penetration for smoked sausage casings is highly desirable (to say the least). The browning agent of US 357 is simply no longer required in the present invention. Hence the

omission of an element thought to be required for a highly desirable function clearly evidences the patentability of the claimed invention.

And US 357 most certainly does not teach or suggest that inventive food casings having the recited surface energy and a swelling value of at least 5% which are further either a single-layered film having a thickness of up to 130 μm or a multilayered film having a polyamide inner layer with a thickness of up to 70 μm would result in liquid-smoke-impregnated food casings that do not require an additional browning agent, as recited in Claim 1 as-amended. US 357 instead provides a generic list of materials, including polyamides known to have inferior absorption, and is altogether silent as to casing thickness.

US 357 thus can not teach or suggest that food casings incorporating polyamide and/or copolyamide alone as a sole or inner layer having a surface energy of 35 to 45 dyn/cm and either a single-layered thickness of 50 to 130 μm or a polyamide inner layer thickness of 15 to 27 μm in which the casing or the polyamide inner layer of the casing has a swelling value of 25 to 100 wt % would permit the impregnation of the casing with liquid smoke in the absence of an additional browning agent, as recited in Claim 13 as-amended.

US 357, expressly teaching both nylon 11 and nylon 12 as suitable in its invention, likewise fails to teach or suggest such inventive food casings in which the polyamide and/or copolyamide is selected from nylon 6; nylon 6,6; nylon 6/6,6; nylon 4,6; nylon 6,10; nylon 6, 12 and mixtures thereof, optionally further comprising polyether amide; polyester amide; polyether ester amide; polyamide urethane or up to 30 % by weight of at least one partially aromatic (co)polyamide, as recited in newly added Claim 14.

Accordingly, Applicants respectfully submit that the claimed invention is patentable in light of US 357, considered either alone or in combination with the remaining art of record.

US 427 does not cure the deficiencies in US 357.

In contrast to the recited liquid-smoke-impregnated food casings, US 427 is directed to single-layered films with improved UV barrier. US 427 initially discloses that nylon is thought to provide “unsteady” stretching behavior. (Col. 2, lines 12 – 26). US 427 goes on to form single-layered films from a mixture of polyamide/copolyamide, polyolefin and pigment. (Col. 3, lines 24 – 34). The polyolefin is present in amounts of up to 30%. (Col. 4, lines 59 – 61). US 427 notes the preferable incorporation of nylon 11 or nylon 12. (Col. 3, line 67 – Col. 4, line 2). US 427 touts that its films have a “relatively low” thickness, preferably ranging from about 25 to 40 microns. (Col. 6, lines 2 – 5). US 427 is silent as to the surface energy of its films.

Applicants respectfully reiterate that US 427, directed to improved UV barrier properties, does not teach or suggest the recited liquid-smoke-impregnated food casing, much less such casings impregnated with liquid smoke, but not with an additional browning agent.

Nor does US 427, altogether silent as to surface energy, teach or suggest the recited liquid-smoke-impregnated food casing in which the inside of the casing has a surface energy of greater than 28 dyn/cm.

And US 427, requiring polyolefin within its polymer blend, most certainly does not teach or suggest advantageous food casings comprising a single-layer whose polymer is based on polyamide and/or copolyamide alone, or comprising an inner layer whose polymer is based on polyamide and/or copolyamide alone, as recited in Claim 1 as-amended. In fact, Applicants respectfully submit that to omit the required polyolefin from US 427 would render it unfit for its intended purpose.

US 427 likewise fails to teach or suggest that inventive food casings having the recited composition and surface energy with a swelling value of at least 5% which are further either a single-layered film having a thickness of up to 130 μm or a multilayered film having a polyamide inner layer with a thickness of up to 70 μm would result in liquid-smoke-impregnated food casings that do not require an additional browning agent, as recited in Claim 1 as-amended.

US 427 thus can not teach or suggest that food casings incorporating polyamide and/or copolyamide alone as a sole or inner layer having a surface energy of 35 to 45 dyn/cm and either a single-layered thickness of 50 to 130 μm or a polyamide inner layer thickness of 15 to 27 μm in which the casing or the polyamide inner layer of the casing has a swelling value of 25 to 100 wt % would permit the impregnation of the casing with liquid smoke in the absence of an additional browning agent, as recited in Claim 13 as-amended.

US 427, similarly teaching the preferable incorporation of nylon 11 or nylon 12, similarly fails to teach or suggest such inventive food casings in which the polyamide and/or copolyamide is selected from nylon 6; nylon 6,6; nylon 6/6,6; nylon 4,6; nylon 6,10; nylon 6, 12 and mixtures thereof, optionally further comprising polyether amide; polyester amide; polyether ester amide; polyamide urethane or up to 30 % by weight of at least one partially aromatic (co)polyamide, as recited in newly added Claim 14.

Accordingly, Applicants respectfully submit that the claimed invention is patentable in light of US 427, considered either alone or in combination with the remaining art of record.

The claimed invention is similarly patentable in further view of US 410.

US 410 is directed to highly uniform, back-seamed casings incorporating a polyamide layer disposed between outermost layers of polyolefin. (Col. 2, lines 5 – 10; Col. 3, lines 55 – 65; Col. 4, lines 35 – 36; Col. 4, lines 45 – 46; Col. 16, lines 6 – 9; and Col. 21, lines 3 - 14). The center polyamide layer of US 410 purportedly produces films that do not neck down during back-seaming. (Col. 3, lines 20 – 26; Col. 18, lines 17 – 18; Col. 18, lines 44 - 46). US 410 teaches that the thickness of the polyamide layer should be less than 70 %. (Col. 18, lines 19 – 24).

US 410 expressly cautions that use of polyamide in contact with food can provide “too much meat-adhesion.” (Col. 3, lines 42 – 43). Consequently, US 410 provides an inner layer formed from anhydride-containing polyolefin to provide suitable meat-adhesion. (Col. 3, lines 44 – 55). US 410 goes on to generically note that its casings may be corona treated. (Col. 5,

lines 55 – 56 and Col. 27, line 64 – Col. 28, line 3). Such corona treatment is said to increase adhesion of its films to “proteinaceous material.” (Col. 28, lines 13 – 15). US 410 further indicates that a core layer of polyamide is not required for all applications. (Col. 26, lines 13 – 16). US 410 generically indicates that its films may include additives, such as talc, antioxidants and the like. (Col. 27, lines 23 – 30).

The Office Action indicates at Page 6, Ref. No. 13 of the outstanding Office Action that it would have been obvious to have corona treated the inventive polyamide sausage casings in light of US 410 in order to provide sufficient meat adhesion. Applicants respectfully submit US 410 clearly does not teach the use of corona treatment in combination with polyamides, as US 410 expressly cautions that untreated polyamides alone provide “too much meat-adhesion.” Hence US 410 incorporates an anhydride-containing polyolefin as the casing inner layer to provide more moderate adhesive properties, and this anhydride-containing polyolefin may subsequently be corona treated.

US 410, broadly directed to more uniform films having improved processing characteristics, does not teach or suggest the inventive liquid-smoke-impregnated food casings, much less such casings impregnated on the inside with liquid smoke, but not with an additional browning agent.

US 410, repeatedly teaching polyolefin layers in contact with food, further does not teach or suggest liquid-smoke-impregnated food casings comprising a single-layer whose polymer is based on polyamide and/or copolyamide alone, or comprising an inner layer whose polymer is based on polyamide and/or copolyamide alone. In fact, US 410 teaches away from such casings by indicating that polyamide imparts “too much meat-adhesion.” US 410 likewise teaches away from single-layered embodiments by teaching a 70 % maximum for the polyamide layer.

And US 410 most certainly does not teach or suggest such polyamide and/or copolyamide casings in which the inside of the casing provides a surface energy of greater than 28 dyn/cm. As

noted above, US 410 expressly teaches that casings formed from polyamides inherently impart “too much meat-adhesion.”

Nor does US 410 teach or suggest that polyamide and/or copolyamide casings having either a single-layered thickness of 20 to 130 μm or inner layer thickness of 15 to 70 μm and a swelling value of at least 5% could be used to form liquid-smoke-impregnated food casings in the absence of an additional browning agent, as further recited in Claim 1 as-amended.

US 410 thus can not teach or suggest that food casings incorporating polyamide and/or copolyamide alone as a sole or inner layer having a surface energy of 35 to 45 dyn/cm and either a single-layered thickness of 50 to 130 μm or a polyamide inner layer thickness of 15 to 27 μm in which the the casing or the polyamide inner layer of the casing has a swelling value of 25 to 100 wt % would permit the impregnation of the casing with liquid smoke in the absence of an additional browning agent, as recited in Claim 13 as-amended.

Accordingly, Applicants respectfully submit that the claimed invention is patentable in light of US 410, considered either alone or in combination with the remaining art of record.

The claimed invention is likewise patentable in further light of US 295.

US 295 is directed to sausage casings that avoid tightening lubricating agents and moisture retaining agents. (Col. 2, lines 62 – Col. 3, line 2). In contrast to the inventive smoke-containing casings, US 295 expressly states that its casings contain “no additional additives,” other than water. (Col. 5, lines 28 – 31). US 295 notes water absorption of up to 13%. (Col. 5, lines 1 – 5). The working examples of US 295 indicate a maximum water content of 10 %. (Col. 8, Table 1 and Col. 9, Table 2).

US 295, generically directed to casings avoiding lubricating and moisture retaining agents that further contain no additional additives, does not teach or suggest inventive liquid-smoke-impregnated food casings, much less that casings incorporating polyamide or co-polyamide

which further exhibit a surface energy of greater than 28 dyn/cm may be impregnated on the inside with liquid smoke in the absence of an additional browning agent.

Nor does US 295 teach or suggest that such liquid-smoke-impregnated food casings could be formed from either single-layered casings having a thickness of 20 to 130 μm or multilayered casings incorporating an polyamide inner layer having a thickness of 15 to 70 μm in which the casing or the polyamide inner layer of the casing has a swelling value of at least 5%, as further recited in Claim 1 as-amended.

US 295 thus can not teach or suggest that food casings incorporating polyamide and/or copolyamide alone as a sole or inner layer having a surface energy of 35 to 45 dyn/cm and either a single-layered thickness of 50 to 130 μm or a polyamide inner layer thickness of 15 to 27 μm in which the casing or the polyamide inner layer of the casing has a swelling value of 25 to 100 wt % would permit the impregnation of the casing with liquid smoke in the absence of an additional browning agent, as recited in Claim 13 as-amended.

Nor does US 295 teach or suggest polyamide and/or copolyamide optionally further comprising polyether amide; polyester amide; polyether ester amide; polyamide urethane or up to 30 % by weight of at least one partially aromatic (co)polyamide, as recited in newly added Claim 14.

Accordingly, Applicants respectfully submit that the claimed invention is patentable in light of US 295, considered either alone or in combination with the remaining art of record.

There would have been no motivation to have combined US 357, directed to food casings containing a mixture of liquid smoke and browning agent, US 427, directed to UV resistant food casings that include polyolefin, and US 410, directed to films that do not neck down during back-seaming having a polyamide inner layer and US 295, directed to sausage casings avoiding tightening lubricating agents and moisture retaining agents. These are also altogether different problems solved.

Applicants respectfully submit that casings suitable for one application will not automatically work in another application, as each application has its own unique requirements. Therefore, a casing suitable for one application may not suggest a solution for another application. Applicants respectfully submit that the Office Action is instead indulging in impermissible hindsight by merely picking and choosing elements from the prior art (as well as excluding art-required elements) using the instant specification as the guide for that selection process.

However, even if one had combined US 357, US 427, US 410 and US 295 (which they did not), the claimed invention would not result.

The combination more specifically fails to teach or suggest that food casings incorporating polyamide or co-polyamide alone as a sole or inside layer having a surface energy of greater than 28 dyn/cm and either single-layered thickness of 20 to 130 μm or a polyamide inner layer thickness of 15 to 70 μm in which the casing or the polyamide inner layer of the casing has a swelling value of at least 5% would permit the impregnation of the casing with liquid smoke in the absence of an additional browning agent, as recited in Claim 1 as-amended.

The combination thus can not teach or suggest that food casings incorporating polyamide and/or copolyamide alone as a sole or inner layer having a surface energy of 35 to 45 dyn/cm and either a single-layered thickness of 50 to 130 μm or a polyamide inner layer thickness of 15 to 27 μm in which the casing or the polyamide inner layer of the casing has a swelling value of 25 to 100 wt % would permit the impregnation of the casing with liquid smoke in the absence of an additional browning agent, as recited in Claim 13 as-amended.

Accordingly, Applicants respectfully submit that the claimed invention is patentable in light of US 357, US 427, US 410 and US 295 considered either alone or in combination.

CONCLUSION

It is respectfully submitted that Applicants have made a significant and important contribution to the art, which is neither disclosed nor suggested in the art. It is believed that all of pending Claims 1 through 8 and 12 through 14 are now in condition for immediate allowance. It is requested that the Examiner telephone the undersigned if any questions remain to expedite examination of this application.

It is not believed that extensions of time or fees are required, beyond those which may otherwise be provided for in documents accompanying this paper. However, in the event that additional extensions of time and/or fees are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required is hereby authorized to be charged to Deposit Account No. 50-2193.

Respectfully submitted,

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